

REMARKS

This application is amended to place it in condition for allowance.

Status of the Claims

Claims 5, 6, 9 and 13 were amended to recite the thickness of the chromium film coated on the metallic surface in light of Figure 2 (i.e., oxygen is present at least up to 100 nm in the depth), the baking treatment disclosed on page 8, lines 10-14, and to clarify the meaning of "chromium layer", i.e., chromium from the baked chromium film that was not oxidized. That is, as discussed at page 6, lines 3-11 and page 10, lines 3-7, the chromium coat film is coupled to the metallic material at the interface.

Although the claims recite the newly added features as product-by-process features, the process steps do result in distinct product characteristics. That is, coating followed by baking provides the claimed invention with the coupling at the interface of the chromium film and metallic material surface, i.e., as explained in view of page 6, lines 3-11 and page 10, lines 3-7. Indeed, when the baking is executed before the heat/oxidizing treatment as claimed, the contactability at the metallic material/chromium interface is improved as the concentration of water is greatly reduced, as described on page 8, lines 10-14. As evidenced by Figures 2 and 3, not all of the

chromium film coated onto the metallic material surface is oxidized. This "chromium" is the baked, coated chromium film which provides the coupling at the interface after oxidation.

Claims 5, 6, 9, 13-16 and 18-21 remain pending in the application.

Claim Rejections-35 USC §112

Claims 5, 6, 9, 13-16 and 18-21 were rejected under 35 U.S.C. §112, first paragraph, for not complying with the written description requirement. This rejection is respectfully traversed for the reasons below.

The position of the Official Action was that the limitation "a chromium layer..." recited in claims 5, 6, 9 and 13 was not described in the specification, or specifically a structure that comprises a chromium layer and a chromium oxide layer in combination.

The claims are amended to further clarify the meaning of "a chromium layer", as the chromium of the baked chromium film coated onto the metallic material surface that is not oxidized, i.e., baked not oxidized chromium. This non-oxidized chromium is located between the chromium-oxide passivation film and the metallic material, and remains adhered to the metallic material so that said chromium-oxide passivation film is coupled to said metallic material.

This recitation is most clearly suggested by Figure 2, which illustrates the decreasing oxygen concentration as the depth increases in Figure 2. As discussed in lines 8-10 of page 9, substantially 100% chromium oxide exists from the outermost surface to approximately 30 nm into the depth of the film.

Indeed, as evidenced by the discussion relative to Figure 3, chromium in a form other than oxides of chromium exists in the baked chromium film portion located closest to the metallic material. Figure 3 shows the evaluation of the metallic material surface on the corrosion resistance of the chromium oxide passivation film (See, e.g., the first paragraph of page 5). As further explained in the discussion on page 9, lines 16-23, the corrosion occurs when "adhesion of the interface between the metallic material and the chromium-coat film deteriorates". Thus, the test of Figure 3 is for film comprising chromium oxide at the surface to 30nm in the depth and a portion of the baked chromium film where non-oxidized chromium is present which must adhere to the metallic material in order to avoid corrosion problems.

Moreover, as discussed at page 6, lines 3-11 and page 10, lines 3-7, the chromium coat film is coupled to the metallic material at the interface and adhesion of this film is improved during heat treatment by baking (page 8, lines 10-14). Oxidation nearest to the outer surface improves corrosion resistance.

The paragraph bridging pages 9 and 10 further states that "the chromium-oxide passivation film having corrosion resistance, which is excellent in adhesion of the interface between the metallic material and the chromium-coat film can be formed when the surface roughness (Ra) is not more than 1.5µm."

Thus, the further clarification of "chromium layer" as the chromium of the baked chromium film that is not oxidized is believed to be supported by the specification, when read in its entirety.

Therefore, the claims meet the written description requirement, and withdrawal of the rejection is respectfully requested.

Conclusion

In view of the amendment to the claims and the foregoing remarks, applicants believe that the present application is in condition for allowance at the time of the next Official Action. Allowance and passage to issue on that basis is respectfully requested.

Should there be any matters that need to be resolved in the present application, the Examiner is respectfully requested to contact the undersigned at the telephone number listed below.

The Commissioner is hereby authorized in this, concurrent, and future submissions, to charge any deficiency or credit any overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

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